Stepping Forward Population Objectives and Delivering Conservation

Partners in Flight
Conservation Design Workshop
11-13 April 2006

Workshop Goal

… to help participants better understand spatial models and other approaches that can be used to develop landscape-level habitat models, bird-habitat association models, and predictive models. We will discuss how to use these models to inform our population estimates, set population goals, and quantify habitat objectives needed to reach those goals. The focus of the workshop will be at the BCR scale, but we will also address the importance of creating models that are scaleable to larger or smaller scales.

Five-Elements Process

1. Landscape assessment
2. Population response models
3. Conservation opportunities assessment
4. Community-based optimal landscape design
5. Monitoring and evaluation

Major Themes for Panel Discussion

- Top-down or bottom up: how do our models help us reconcile these two approaches?
- What are the benefits and drawbacks of different modeling approaches for determining population-based habitat objectives, and what criteria might we use to choose an approach?

Major Themes for Panel Discussion 2

- How do we validate our models?
- When is it appropriate to use abundance-based vs. demographic metrics?
- How necessary is it for us to standardize our approach across regions?

1. Development of spatial and ecological data
2. Database models
3. GIS-based HSI models
4. Statistical models

- Not competing but can be viewed as a progression or evolution of effort
- Can get started with whatever level knowledge or technical expertise you have
- Effort at any lower scale can contribute to later efforts
- May not always be able to get statistical solutions
- Differences in spatial resolution

HSI modeling approaches

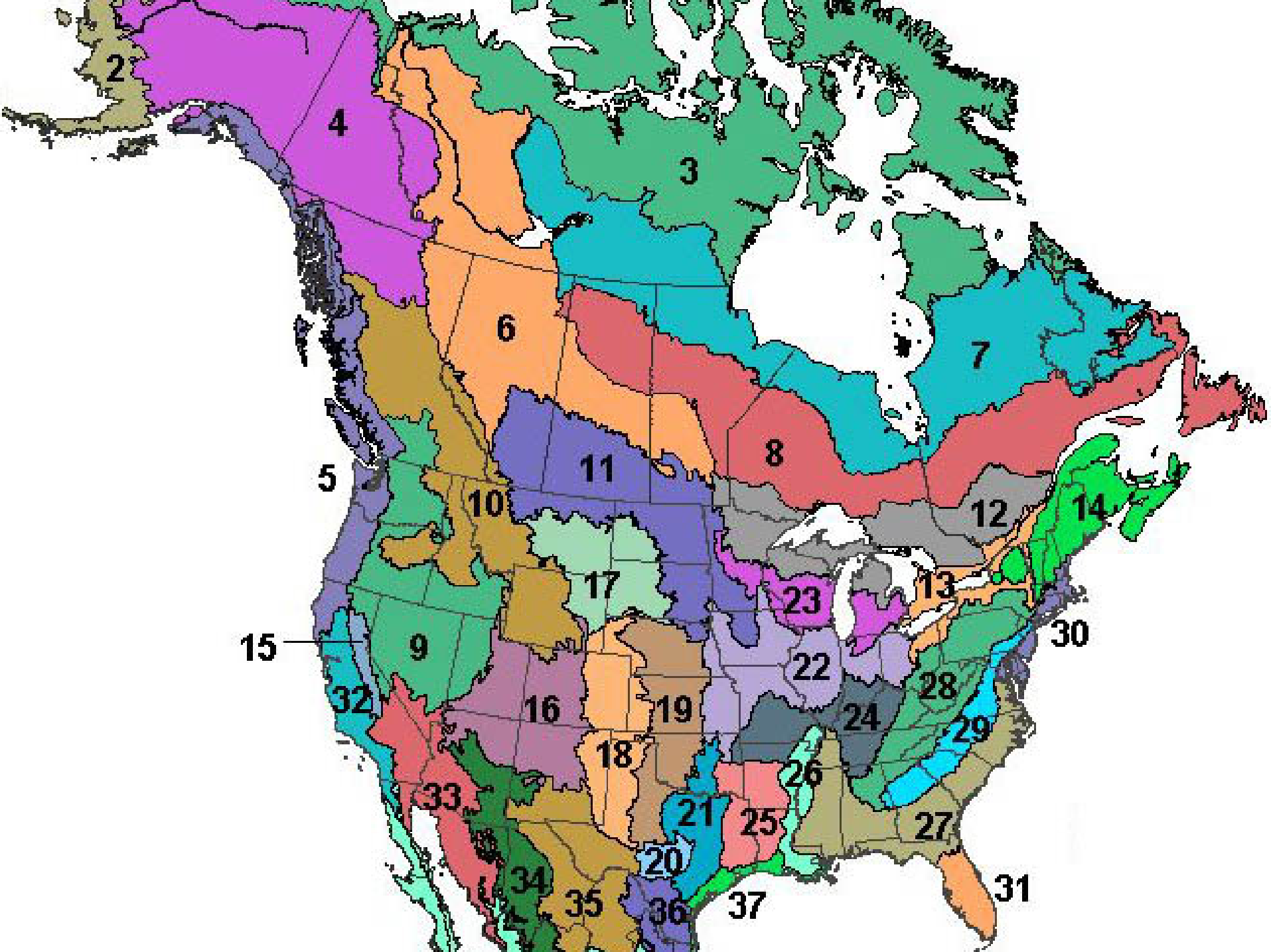
- Can be developed from existing knowledge or data which can include data, published knowledge, and expert or non expert opinion.
- Can adapt habitat relationships from research studies to available data sources for conservation planning.
- Can address concepts of abundance and viability.
- Can address both pixel and landscape level processes (local management and landcover)
- Models are essentially hypotheses until validated

Statistical modeling approaches

- Hierarchical spatial models represent the current state of the art.
- Should be developed from surveys and data layers designed for inference at the appropriate scale. Bird data is currently limited to BBS and a few other data sets
- BBS approaches well suited to estimating counts at large scales using large scale covariates like landcover
- BBS approaches do not address pixel level attributes (local management) very well.
- Models should be developed from a priori hypotheses; data mining exercises can over fit models to a data set and result in models that will not perform as well when applied to a BCR.

1. Development of spatial and ecological data
2. Database models
3. GIS-based HSI models
4. Statistical models

- Efforts have focused on tools and less so on decision support and optimization
- We need to place the whole process of conservation design within an adaptive planning and monitoring model.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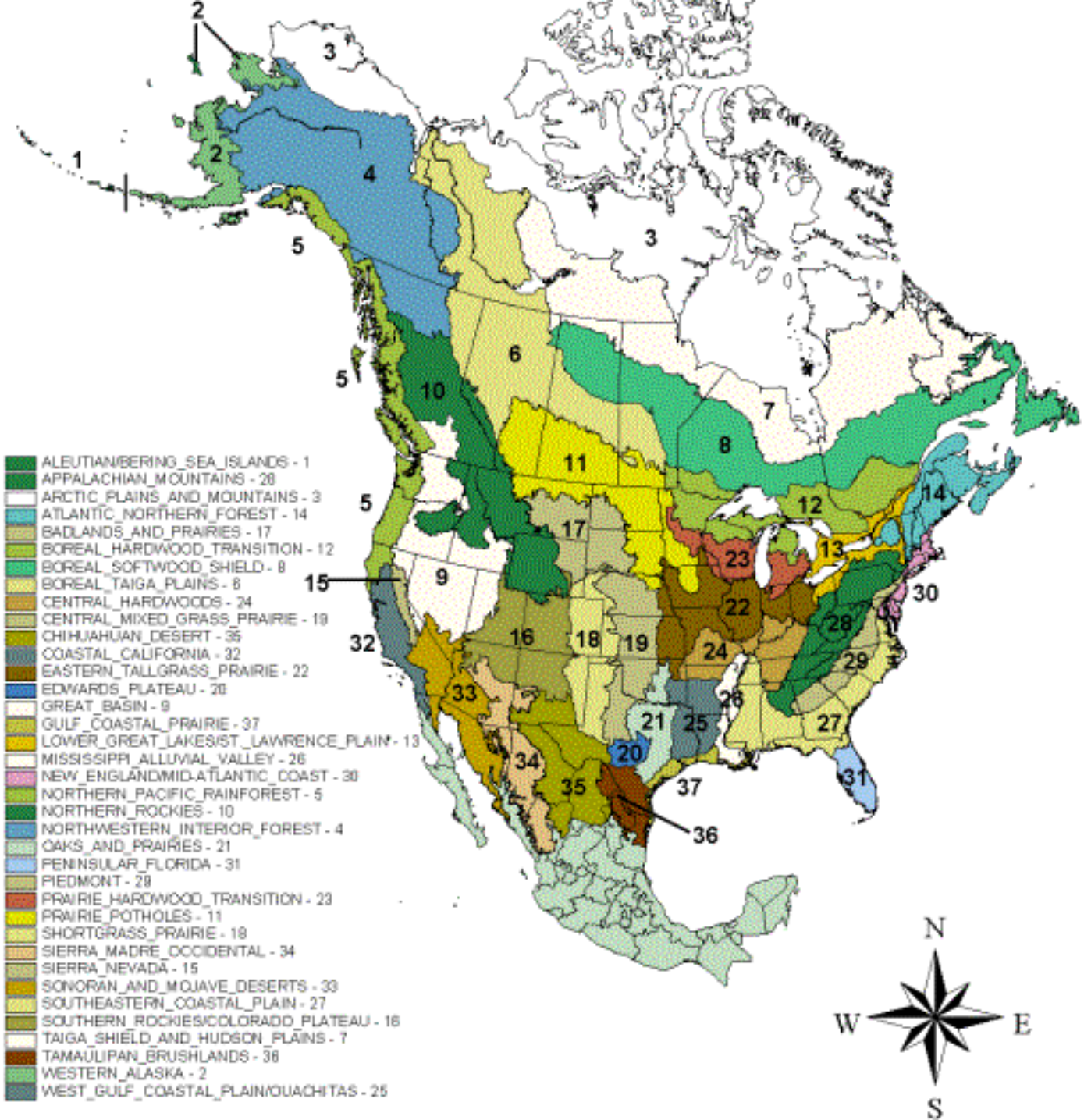
ALEUTIAN/BERING_SEA_ISLANDS - 1
APPALACHIAN_MOUNTAINS - 28
ARCTIC_PLAINS_AND_MOUNTAINS - 3
ATLANTIC_NORTHERN_FOREST - 14
BADLANDS_AND_PRAIRIES - 17
BOREAL_HARDWOOD_TRANSITION - 12
BOREAL_SOFTWOOD_SHIELD - 8
BOREAL_TAIGA_PLAINS - 6
CENTRAL_HARDWOODS - 24
CENTRAL_MIXED_GRASS_PRAIRIE - 19
CHIHUAHUAN_DESERT - 35
COASTAL_CALIFORNIA - 32
EASTERN_TALLGRASS_PRAIRIE - 22
EDWARDS_PLATEAU - 20
GREAT_BASIN - 9
GULF_COASTAL_PRAIRIE - 37
LOWER_GREAT_LAKES/ST._LAWRENCE_PLAIN - 13
MISSISSIPPI_ALLUVIAL_VALLEY - 26
NEW_ENGLAND/MID-ATLANTIC_COAST - 30
NORTHERN_PACIFIC_RAINFOREST - 5
NORTHERN_ROCKIES - 10
NORTHWESTERN_INTERIOR_FOREST - 4
OAKS_AND_PRAIRIES - 21
PENINSULAR_FLORIDA - 31
PIEDMONT - 29
PRAIRIE_HARDWOOD_TRANSITION - 23
PRAIRIE_POTHOLES - 11
SHORTGRASS_PRAIRIE - 18
SIERRA_MADRE_OCCIDENTAL - 34
SIERRA_NEVADA - 15
SONORAN_AND_MOJAVE_DESERTS - 33
SOUTHEASTERN_COASTAL_PLAIN - 27
SOUTHERN_ROCKIES/COLORADO_PLATEAU - 16
TAIGA_SHIELD_AND_HUDSON_PLAINS - 7
TAMAULIPAN_BRUSHLANDS - 36
WESTERN_ALASKA - 2
WEST_GULF_COASTAL_PLAIN/OUACHITAS - 25
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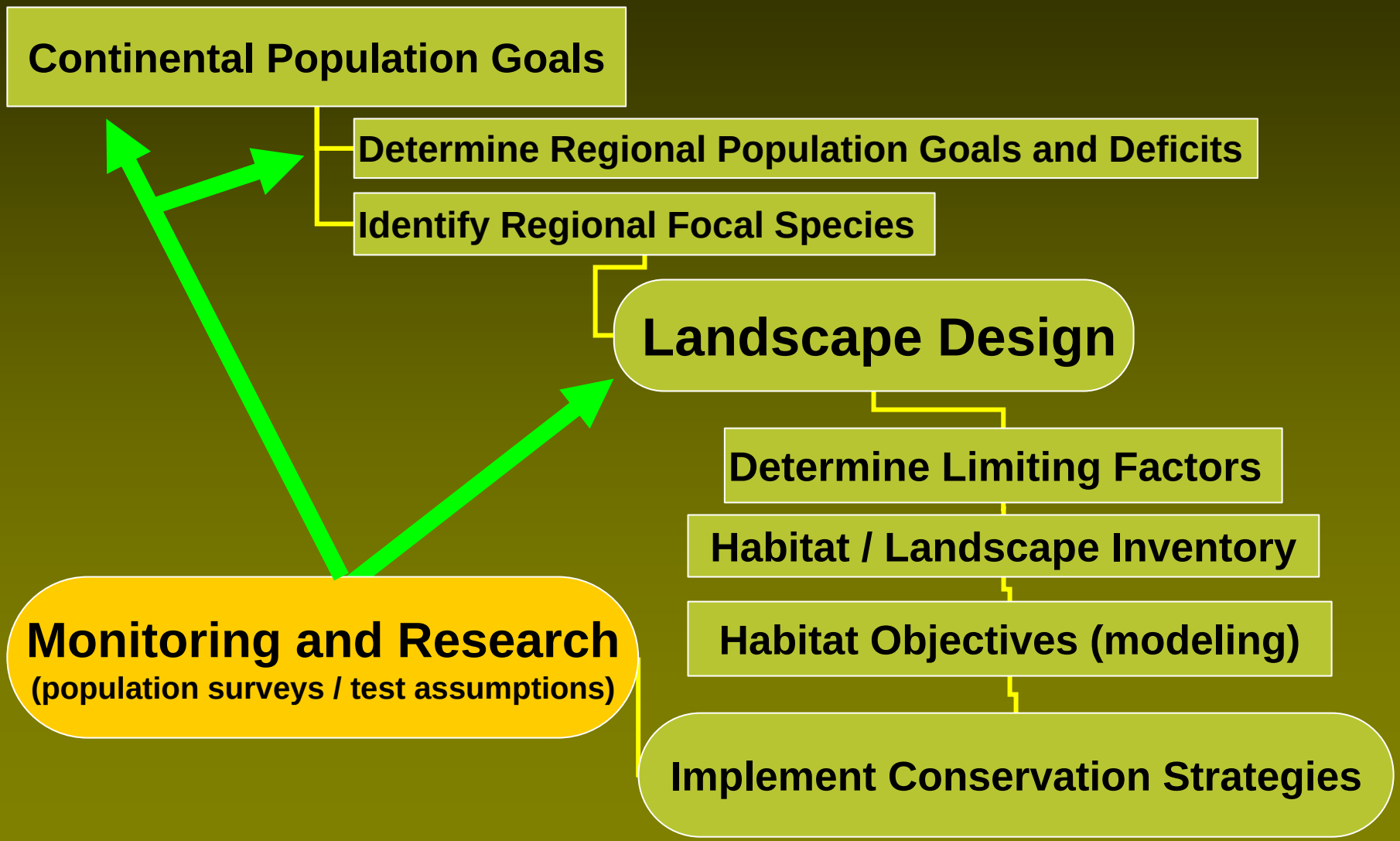
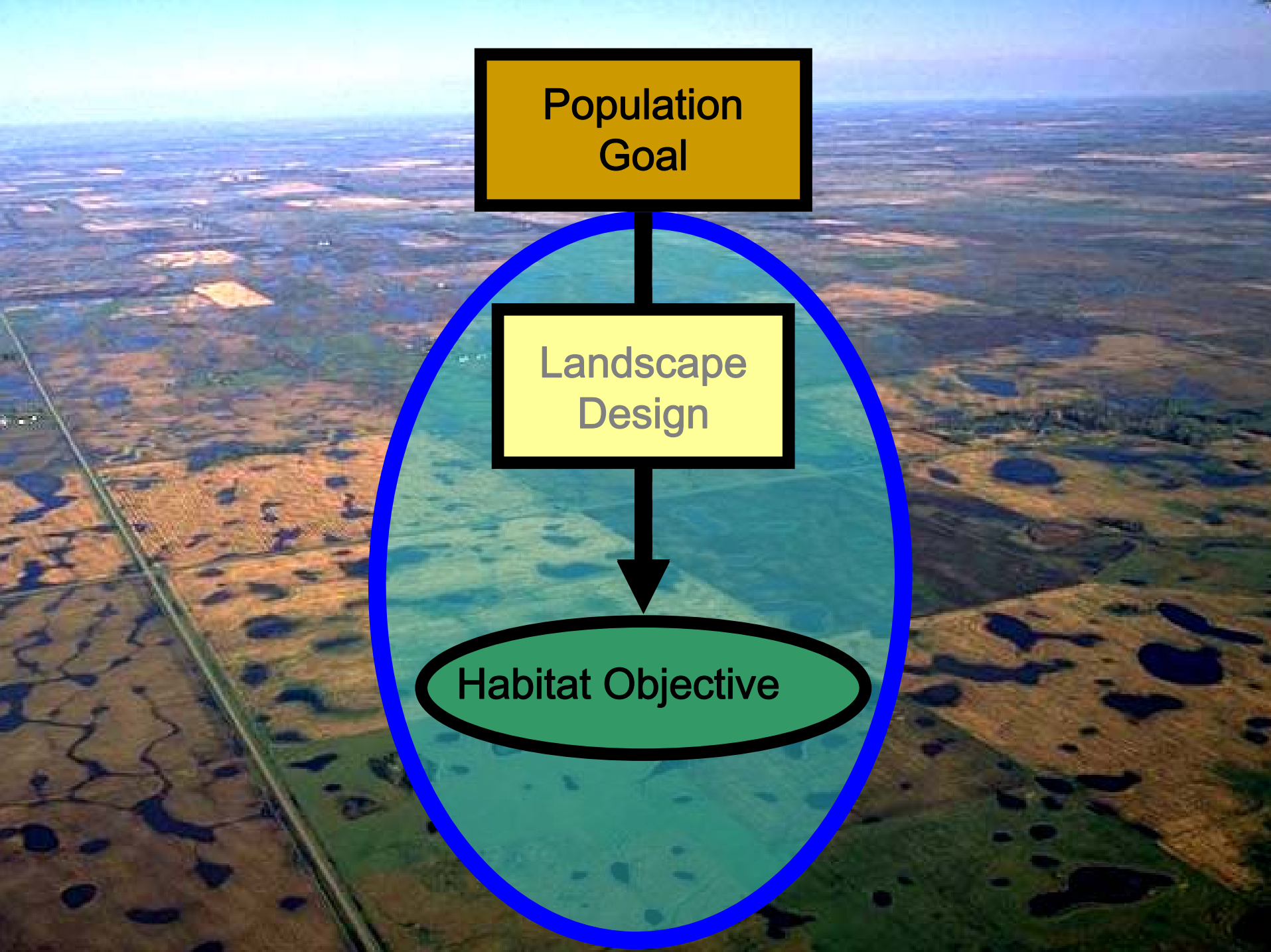
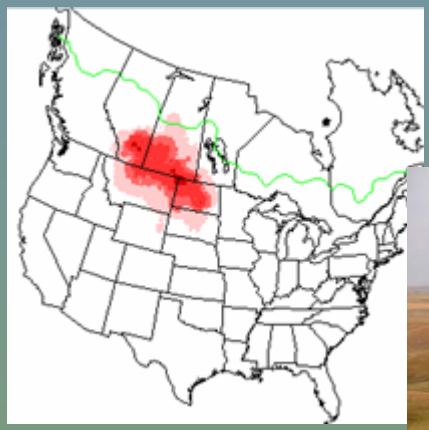
Improving the WBCI Science Foundation




Population Goal
Landscape Design
Habitat Objective

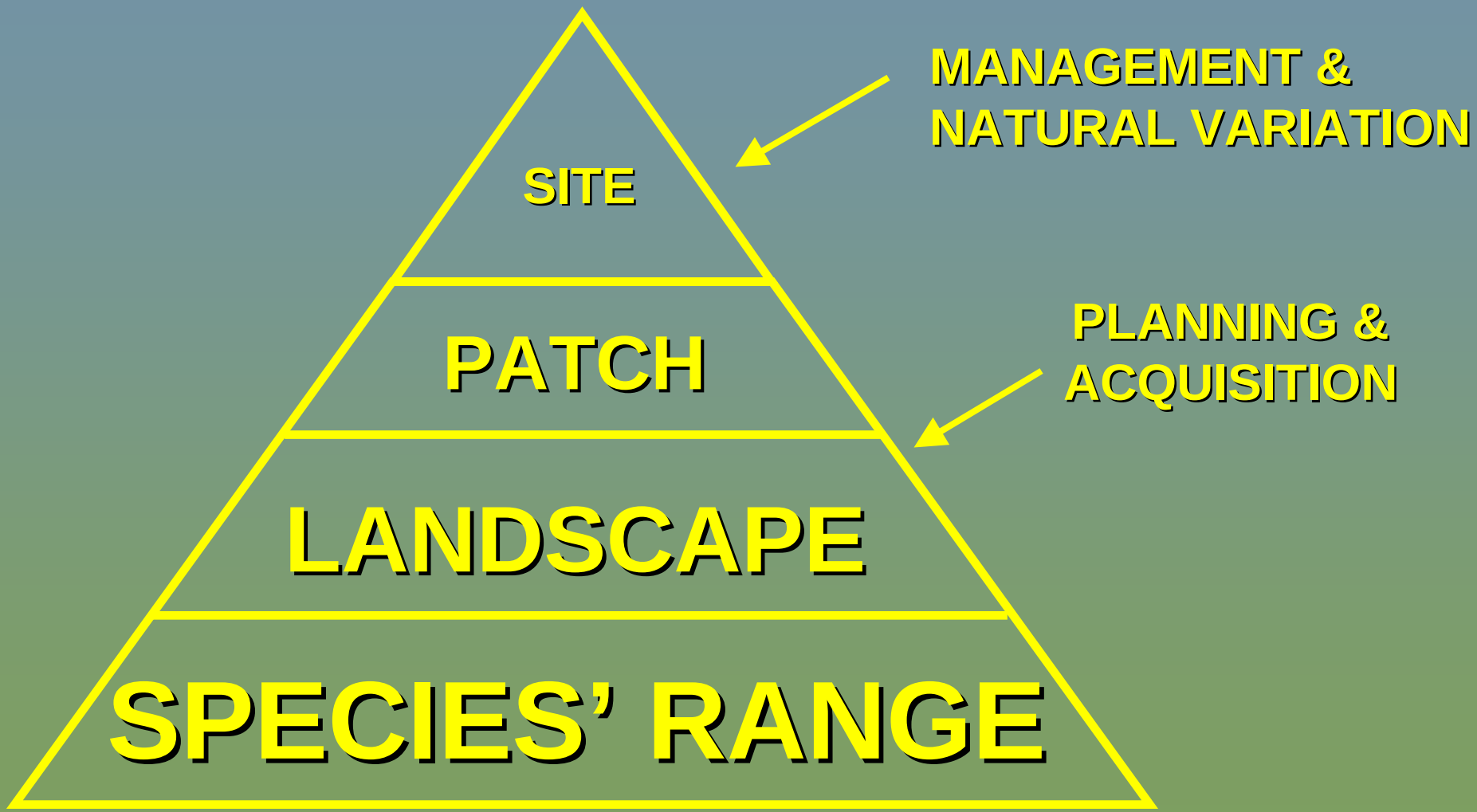
WHY PLAN ON A LANDSCAPE SCALE?

BIRDS RESPOND TO LANDSCAPES AS PART OF A HIERARCHICAL SELECTION PROCESS



EASIER TO MANAGE SITES WITHIN LANDSCAPES THAN TO MANAGE LANDSCAPES AROUND SITES

SCALE INFLUENCES CONSERVATION ACTIONS



The Traditional Paradigm		The "New" Paradigm
Program-based	→	Program-based
Agency-specific	→	Collaborative
Opportunity-driven	→	Science-driven
Site-oriented	→	Landscape- or Population-oriented
Planning-averse	→	Planning-intense
Monitoring and Evaluation are dispensable	→	Monitoring and Evaluation are indispensable
Management actions are treated as if they are goals	→	Management actions are based on population goals and biology

Form follows Function

Functions of Population Objectives:

- Communication and Marketing Devices
  - Clear and easily understood
- Foundation for Conservation Strategies
  - Inform issues of how much habitat is needed and limiting factors
- Performance Metrics for Evaluating Accomplishments and Planning Assumptions
  - Insensitive to environmental variation and other factors beyond management control

Characteristics of good population objectives

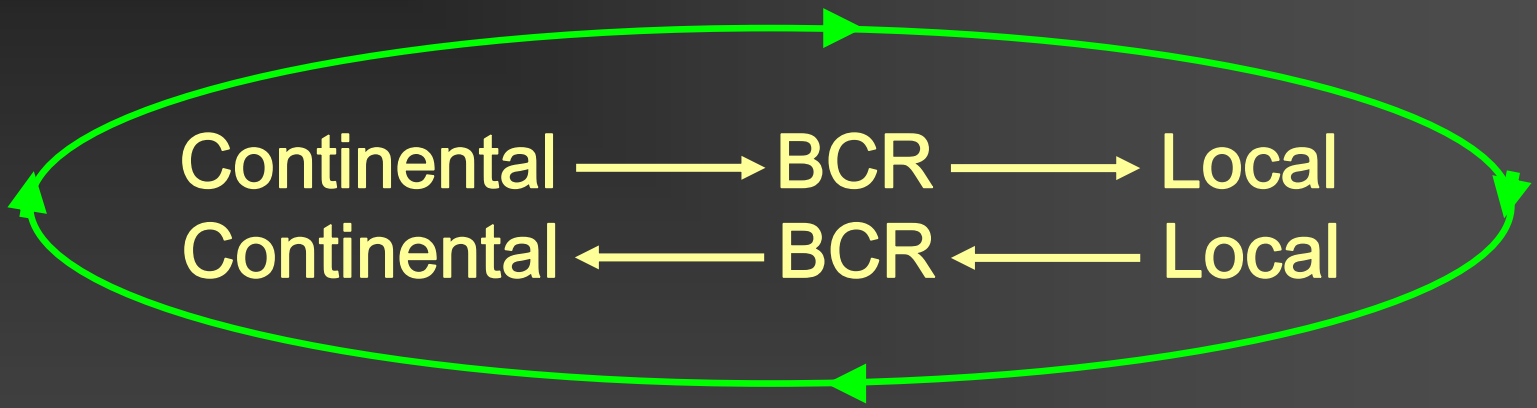
- Communicable
  - Understandable/interpretable
- Consistent
  - With management plans and conservation plans
  - With management and spatial/temporal scales
  - With current estimation methodology
- Comparable
  - Numeric/quantitative
  - Measurable through a monitoring program
  - Scalable to account for uncontrolled environmental variation

A comprehensive regional population objective has both abundance-based and performance-based “sub-objectives”

p1 Objectives = Abundance-based objectives

Arbitrary – A value-based statement

A device for building consensus among partners



Little potential to assess management performance

Continental → Local

Value of Abundance-based Objectives as Performance Indicators

Higher → Low

p2 Objectives = Performance indicators

Examples:

0.6 recruitment rate

0.9 breeding hen survival

15% increase in lipid reserves of migrants

Less useful for developing habitat objectives

Generally only relevant at regional and local scales

Forces identification of limiting factors

Suitable performance metrics (although difficult to monitor) – can be monitored annually for regular periodic assessment, matches the temporal scale of management decisions